

Internet and paper self-help materials for problem drinking: Is there an additive effect?

John A. Cunningham^{a,b,*}, Keith Humphreys^{c,d}, Anja Koski-Jännes^e,
Joanne Cordingley^a

^a*Centre for Addiction and Mental Health, 33 Russell Street, Toronto, Ontario, Canada M5S 2S1*

^b*University of Toronto, Toronto, Canada*

^c*Center for Health Care Evaluation, Veterans Affairs, United States*

^d*Stanford University, United States*

^e*University of Tampere, Finland*

Abstract

The objective of this study was to conduct a preliminary evaluation of an Internet-based intervention for problem drinkers, comparing changes in drinking between respondents who only received the intervention to those who also received a self-help book. After receiving a personalized feedback summary on the Internet, 83 respondents provided complete baseline information and volunteered to participate in a 3-month follow-up survey. Half of the respondents were randomized to receive an additional self-help book. The follow-up was returned by 48 respondents (69% female). Repeated measures ANOVAs were conducted to compare drinking levels at baseline and 3-month follow-up among respondents who only received the Internet-based intervention. There was minimal support for an impact of the Internet intervention alone. In addition, hierarchical regression analyses were conducted to compare respondents in the two intervention conditions on their drinking at follow-up, controlling for baseline consumption. Respondents who received the additional self-help book reported drinking less and experiencing fewer consequences at follow-up as compared to respondents who received only the Internet-based intervention. While the results are promising, they cannot be taken as evidence of the efficacy of Internet-based personalized feedback as a stand-alone intervention.

* Corresponding author. Centre for Addiction and Mental Health, 33 Russell Street, Toronto, Ontario, Canada M5S 2S1.

E-mail address: John_Cunningham@camh.net (J.A. Cunningham).

because of the absence of a control group that did not receive the intervention. Further research on this topic should be a priority because of the potential for Internet-based interventions to reach problem drinkers underserved by traditional treatment.

© 2005 Elsevier Ltd. All rights reserved.

Keywords: Internet-based intervention; Problem drinking; Self-help

1. Introduction

As many as one in four adults in the United States and Canada experience some problems due to alcohol consumption (Institute of Medicine., 1990). Most of these problem drinkers will never seek treatment for their alcohol concerns (Cunningham & Breslin, 2004), and thus will continue to place themselves and society at high risk for alcohol-related harm. However, many of these individuals have voiced an interest in materials to help them evaluate their drinking (Koski-Jännes & Cunningham, 2001). The Internet may prove an ideal vehicle for distributing such materials. Access to the Internet is widespread and growing. As many as 75% of the general population have access to the Internet (Ipsos-Reid., 2002). Further, one of the primary uses of the Internet is accessing health information. Given the widespread use of the Internet, the ability to provide well-designed and personalized resources free of charge, and the high level of interest in such services by problem drinkers, Internet-based interventions have the potential to make a major impact on public health.

Many providers appear to have recognized this potential because services for problem drinkers continue to proliferate on the Internet (Copeland & Martin, 2004; Toll et al., 2003). A limited number of pilot studies have reported on participants' initial evaluations of Internet sites providing self-help materials for problem drinkers (Cloud & Peacock, 2001; Cunningham, Humphreys, & Koski-Jännes, 2000; Lieberman, 2003; Linke, Brown, & Wallace, 2004; Squires & Hester, 2002; Westrup et al., 2003). Many other sites are available on the Internet with no research evaluation. However, there have been no evaluations of the efficacy of such interventions to date. Thus, although Internet-based interventions may have huge public health potential for a number of reasons-worldwide access including developing countries, as a way to help underserved populations such as female problem drinkers, young adults, those living in rural areas or who have limitations with transportation—there is also the potential for harm because the efficacy of these interventions remains unevaluated.

The present study reports on an initial outcome evaluation of an Internet-based intervention (Cunningham et al., 2000). There were three hypotheses for the study. Hypothesis 1 stated that respondents who receive an additional self-help book would display greater reductions in their drinking, as compared to those who only received the Internet-based intervention, at a 3-month follow-up. Hypothesis 2 stated that respondents who reported that they were surprised about some aspect of the personalized feedback presented to them would report significantly greater reductions in drinking at a 3-month

follow-up as compared to respondents who were not surprised by anything on the feedback. Personalized feedback interventions, such as the one included on this Internet site, provide normative feedback to individuals—creating a personalized summary of an individual's drinking and comparing it to the consumption of the average male or female in the general population. Normative feedback is theorized to promote change in alcohol use because many heavy drinkers overestimate the consumption of others. Consequently, normative feedback acts as a powerful source of social comparison, motivating heavy drinkers to re-evaluate their consumption patterns (Agostinelli & Miller, 1994). Thus, hypothesis 2 was generated based on the assumption that the personalized feedback provided by this Internet-based intervention would be most effective for individuals who learnt something new or for whom the feedback contradicted previous beliefs (i.e., they were surprised by something). Finally, hypothesis 3 stated that respondents who only received the Internet-based intervention would be drinking less at 3-month follow-up as compared to baseline.

2. Methods

Participants who contact the Internet site provide brief information about their drinking and a personalized assessment feedback is returned to them (for a description of this program, see Cunningham et al., 2000) The program is available at <http://notes.camh.net/efeed.nsf/newform>. The site has been operational since 1998 and received approximately 500 'hits' per month in its first years of service. For a 2-year period, participants were asked if they were willing to participate in a follow-up survey in 3 months time (a hotlink "button" was attached to the end of their personalized feedback that allowed them to go to the consent form and sign up directly on the Internet). Potential respondents read a brief description of the research follow-up and indicated their willingness to participate by providing their name, postal address and some brief information on their initial impression of the feedback site. No incentive was provided to complete the follow-up. Half of the respondents were randomly assigned to either receive or not receive additional self-help materials sent to them by postal mail (a self-help book, "DrinkWise," Sanchez-Craig, 1996). In 3 months time, all participants were sent a follow-up survey by postal mail asking about their drinking during the last 3 months.

The baseline assessment consisted of the 21-item survey used by the Internet site to generate the personalized feedback. This assessment generally takes less than 5 min to complete. The 3-month follow-up consisted of the same items with the exception that they were framed to ask about the last 3 months as opposed to the last year. The Alcohol Use Disorders Identification Test (AUDIT; Babor, De La Fuente, Saunders, & Grant, 1989; Saunders, Aasland, Babor, De La Fuente, & Grant, 1993) was used to assess severity of alcohol problems. The respondent's drinking was assessed using the period-specific normal week approach (Kühlnhorn & Leifman, 1993; Romelsjö, Leifman, & Nyström, 1995). This method of collecting drinking data asks for the alcohol consumption during a typical week in the last year (i.e., usual number of drinks on each

day of a typical week). Five psychosocial consequence items commonly used in general population surveys (e.g., 1994 Canada's Alcohol and Other Drugs Survey; [Statistics Canada, 1994](#)) asked whether in the past 12 months respondents felt that alcohol had a harmful effect on their (i) friendships/social life, (ii) physical health, (iii) home life or marriage, (iv) work, studies, or employment opportunities, or (v) financial position. Some demographic data were collected-age, gender, and country of origin (baseline survey, not follow-up survey). Finally, after consenting to participate in the follow-up survey, respondents were asked if they found anything surprising about the feedback. SPSS was used to conduct the statistical analyses ([SPSS Inc., 2001](#)). For each separate analysis, missing data was handled using list-wise deletion.

3. Results

During the study recruitment period, 83 respondents agreed to participate in the follow-up study and provided complete baseline information (three others agreed but did not provide complete baseline information). Of these, 48 returned the 3-month follow-up (57.8% follow-up rate). There was a significant difference in the proportion of respondents who returned the 3-month follow-up between the Internet only and the Internet plus book conditions (69% vs. 46%, respectively; $\chi^2 = 3.5$, 1 *df*, $p < .05$). Analyses were also conducted to test for differences in baseline drinking and demographic characteristics between those who returned or did not return their follow-up survey. The only significant difference observed was that respondents who returned the survey had a significantly lower mean AUDIT score as compared to those who did not return the follow-up (Mean [S.D.] = 17.3 [9.6] and 21.9 [9.3], respectively; t -test = 2.2, 79 *df*, $p < .05$). In addition, comparisons were made on the baseline demographic and drinking characteristics of respondents in the feedback only condition ($N = 29$) vs. the feedback plus self-help book condition ($N = 19$). There were no significant differences ($p > .05$) on any of the demographic variables. Of the 48 respondents, the mean (S.D.) age was 37.9 (13.0), a large proportion was female (69%) and the majority of the respondents were Canadian residents (75%; 23% USA; 2% Other). Drinking at baseline and 3-month follow-ups are presented in [Table 1](#). While there were no significant differences ($p > .05$) in drinking at baseline, the power to detect any differences was low (Observed power = 0.3) given the small sample size.

Three hierarchical regressions were used to test hypotheses 1 and 2. The outcome variables of interest were mean typical number of drinks in a week (analysis conducted on square root transformed variable as it was positively skewed), mean AUDIT scores, and mean number of consequences experienced. In Step 1 of each regression, the respective baseline-drinking variable was entered. In Step 2, the main effects terms for the intervention condition and the variable coding whether respondents were surprised by the feedback were entered (both dummy coded as 0 vs. 1). Regressions were chosen instead of analyses of covariance for these analyses because no interactions were hypothesized between intervention condition and surprise. As can be seen in [Table 2](#), there were consistent findings for a main effect of intervention condition and marginal findings for a

Table 1
Mean alcohol consumption at baseline and 3-month follow-up by self-help book condition

Variable	Time			
	Baseline		Follow-up	
	Internet only (<i>n</i> = 29)	Internet plus book (<i>n</i> = 19)	Internet only (<i>n</i> = 29)	Internet plus book (<i>n</i> = 19)
Mean (S.D., SqrtMean ^a) drinks/typical week	21.0 (16.6, 4.2)	29.1 (23.2, 5.0)	17.4 (17.7, 3.7)	18.4 (25.8, 3.5)
Mean (S.D.) audit	15.6 (8.9)	19.8 (10.3)	12.6 (7.8)	11.9 (9.9)
Mean (S.D.) number of alcohol consequences	2.4 (1.9)	2.9 (1.8)	1.9 (1.6)	1.5 (1.6)

^a SqrtMean is the mean square root transformed value employed in the regression analysis for this variable because of positive skew.

main effect of surprised by feedback. Observation of the means, presented in Table 1, indicated that respondents who received the additional self-help book reported significantly lower drinking and alcohol-related consequences as compared to respondents who did not receive the additional self-help book. Also, respondents who were surprised by something on their personalized feedback were marginally more likely to report less drinking and consequences as compared to respondents who were not surprised (means not shown).

To test hypothesis 3, the drinking of the 29 respondents who only received the Internet-based intervention was compared between baseline and 3-month follow-up using repeated measures ANOVAs (see Table 1 for means). Respondents reported a significantly lower AUDIT score at 3-month follow-up as compared to baseline, $F = 5.9$, 1, 28 *df*, $p < .05$. While in the hypothesized direction, respondents' weekly alcohol consumption and mean number of consequences reported were not significantly different between baseline and follow-up ($p < .2$ and $p < .08$, respectively).

Table 2
Relationship between 3-month follow-up drinking, intervention condition, and surprise about feedback

Predictor	(Square root) weekly drinking			Audit			Number of consequences ^a		
	ΔR^2	<i>F</i>	β	ΔR^2	<i>F</i>	β	ΔR^2	<i>F</i>	β
Step 1	.398	29.8*		.421	32.7*		.053	4.5**	
Baseline drinking			.63*			.65*			.23**
Step 2	.075	3.1***		.094	4.1**		.099	4.6**	
Intervention			-.24**			-.23**			-.30**
Surprised			-.21			-.26**			-.17

Intervention coded as: No additional book sent = 0; Additional book sent = 1.

Surprised by something in the personalized feedback coded as: No = 0; Yes = 1.

^a Has drinking affected: (i) friendships/social life; (ii) physical health; (iii) home life or marriage; (iv) work, studies, or employment opportunities; and (v) financial position.

* $p < .001$.

** $p < .05$.

*** $p = .056$.

4. Discussion

Respondents who utilized a personalized assessment feedback intervention on the Internet and then received additional materials showed improved drinking outcomes as compared to those who did not receive additional materials. These results indicate the receptivity of this audience for self-help materials. In contrast, the fact that fewer respondents in the Internet plus book condition returned their 3-month follow-up as compared to those in the Internet intervention only condition may indicate that some respondents were not receptive to receiving additional self-help materials unannounced. If true, care should be taken in the way materials are provided to users of Internet-based interventions, perhaps emphasizing the choice of individuals to decide what materials they will receive. Alternatively, because of the small sample size, it is possible that randomization was not entirely successful in providing similar samples in each condition at baseline, leading to a group of respondents with more severe problems in the Internet plus self-help book condition compared to the Internet only condition. However, the small sample size of this pilot study also limited the power of any statistical comparisons, including those between experimental conditions at baseline.

While these results are interesting, it should be stressed that they do not provide evidence of the efficacy of Internet-based interventions in and of themselves. There was a trend for respondents who received only the personalized feedback (no additional self-help book) to report reduced drinking consumption at the 3-month follow-up as compared to their baseline reports. However, because there was no control group in which the Internet-based intervention was not administered, this reduction in drinking cannot be attributed to the feedback intervention with any confidence. In addition, while exact recruitment rates are not known, it is clear that only a small minority of potential respondents agreed to participate, making the generalizability of the results questionable (as an example, in the last month of recruitment, there were 218 ‘hits’ of which 6 agreed to participate; 3% recruitment rate). Future research studies will also need to ensure that comparisons can be made between the characteristics of those who did or did not agree to participate. As one further limitation, the poor response rate for the 3-month follow-up survey means that all the findings of this pilot study should be interpreted with caution. As an example, it is possible that the finding that respondents who did not return the follow-up survey had higher AUDIT scores at baseline as compared to those who did return the follow-up indicated that those with higher AUDIT scores may not have experienced similar benefits from either intervention.

There was a high proportion of female participants in this study. This proportion mirrors the findings of several other Internet evaluations. A particularly exciting aspect of such interventions is their potential to reach underserved groups. Pilot research indicates that Internet-based interventions are well accessed by individuals unlikely to seek traditional alcohol treatment. As an example, the pilot study of this web-site found that 58% of users were female (Cunningham et al., 2000), and a study of Internet-mediated alcohol self-help groups by a member of the project team found that over 80% of users had never sought alcohol treatment (Humphreys & Klaw, 2001). Given the potential for such interventions to provide access to problem drinkers underserved by traditional treatment, further research to assess the effectiveness of Internet-based interventions should be a priority.

References

- Agostinelli, G., & Miller, W. R. (1994). Drinking and thinking: How does personal drinking affect judgments of prevalence and risk. *Journal of Studies on Alcohol*, 55, 327–337.
- Babor, T. F., De La Fuente, M. F., Saunders, J. B., & Grant, M. (1989). *AUDIT—The alcohol use disorders identification test: Guidelines for use in primary health care*. Geneva, Switzerland: World Health Organization.
- Cloud, R. N., & Peacock, P. L. (2001). Internet screening and interventions for problem drinking. *Alcoholism Treatment Quarterly*, 19, 23–44.
- Copeland, J., & Martin, G. (2004). Web-based interventions for substance use disorders: A qualitative review. *Journal of Substance Abuse Treatment*, 26(2), 109–116.
- Cunningham, J. A., & Breslin, F. C. (2004). Only one in three people with alcohol abuse or dependence ever seek treatment. *Addictive Behaviors*, 29(1), 221–223.
- Cunningham, J. A., Humphreys, K., & Koski-Jännes, A. (2000). Providing personalized assessment feedback for problem drinking on the Internet: A pilot project. *Journal of Studies on Alcohol*, 61, 794–798.
- Humphreys, K., & Klaw, E. (2001). Can targeting nondependent problem drinkers and providing internet-based services expand access to assistance for alcohol problems? A study of the moderation management self-help/mutual aid organization. *Journal of Studies on Alcohol*, 62(4), 528–532.
- Institute of Medicine. (1990). *Broadening the base of treatment for alcohol problems*. Washington, DC: National Academy Press.
- Ipsos-Reid. (2002). *Broadband goes mainstream*. Retrieved 1/14/2003, from http://www.ipsos-reid.com/media/dsp_displayr.us.cfm?id_to_view=1491
- Koski-Jännes, A., & Cunningham, J. A. (2001). Interest in different forms of self-help in a general population sample of drinkers. *Addictive Behaviors*, 26, 91–99.
- Kühlhorn, E., & Leifman, H. (1993). Alcohol surveys with high and low coverage rate: A comparative analysis of survey strategies in the alcohol field. *Journal of Studies on Alcohol*, 54, 542–544.
- Lieberman, D. Z. (2003). Determinants of satisfaction with an automated alcohol evaluation program. *Cyberpsychology and Behavior*, 6(6), 677–682.
- Linke, S., Brown, A., & Wallace, P. (2004). Down your drink: A web-based intervention for people with excessive alcohol consumption. *Alcohol and Alcoholism*, 39(1), 29–32.
- Romelsjö, A., Leifman, H., & Nyström, S. (1995). A comparative study of two methods for the measurement of alcohol consumption in the general population. *International Journal of Epidemiology*, 24, 929–936.
- Sanchez-Craig, M. (1996). *DrinkWise: How to quit drinking or cut down* (2nd ed.). Toronto: Addiction Research Foundation.
- Saunders, J. B., Aasland, O. G., Babor, T. F., De La Fuente, J. R., & Grant, M. (1993). Development of the alcohol use disorders identification test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption—II. *Addiction*, 88, 791–804.
- SPSS Inc. (2001). *SPSS for Windows*, Version 11.
- Squires, D. D., & Hester, R. K. (2002). Development of a computer-based, brief intervention for drinkers: The increasing role for computers in the assessment and treatment of addictive behaviors. *The Behavior Therapist*, 59–65.
- Statistics Canada. (1994). *Microdata user's guide: Canada's alcohol and other drugs survey*. Ottawa, Canada: Statistics Canada, Special Surveys Division.
- Toll, B. A., Sobell, L. C., D'Arienzo, J., Sobell, M. B., Eickelberry-Goldsmith, L., & Toll, H. J. (2003). What do Internet-based alcohol treatment websites offer? *Cyberpsychology and Behavior*, 6(6), 581–584.
- Westrup, D., Futa, K. T., Whitsell, S. D., Mussman, L., Wanat, S. F., Koopman, C., et al. (2003). Employees' reactions to an interactive website assessing alcohol use and risk for alcohol dependence, stress level and coping. *Journal of Substance Use*, 8, 104–111.